
Appendix A: Radio & Satellite Navigation Grid

NAVIGATION SYSTEM	FREQUENCY BAND	FREQUENCY RANGE	KEY CONCEPT
VOR	VHF	108.0-117.95 MHz	360 MAG RADIALS
TACAN	UHF	960-1215 MHz	360 MAG RADIALS + DME
DME	UHF	962-1213 MHz	TRANSPONDER ON GROUND
VORTAC	VHF/UHF		COMBINED VOR & TACAN
RNAV (CLC)			COURSE LINE COMPUTER "OFFSETS" NAVAID WAYPOINT MUST BE WITHIN NAVAID RECEPTION RANGE
INS			SELF CONTAINED
NDB	L/MF	190-535 KHz	LEAST ACCURATE/LIGHTNING PRECIPITATION STATIC
ILS	LOC - VHF, GS- UHF	LOC - 108.10-111.95 MHz GS - 329.15-335.0 MHz	BOTH HORIZONTAL AND VERTICAL GUIDANCE. NDB USED WITH MARKER BEACON IS COMPASS LOCATOR
GPS			3 SATELLITES FOR TWO DIMENSION 4 SATELLITES FOR THREE DIMENSIONS

Appendix B: The Instrument Landing System

VHF Localizer

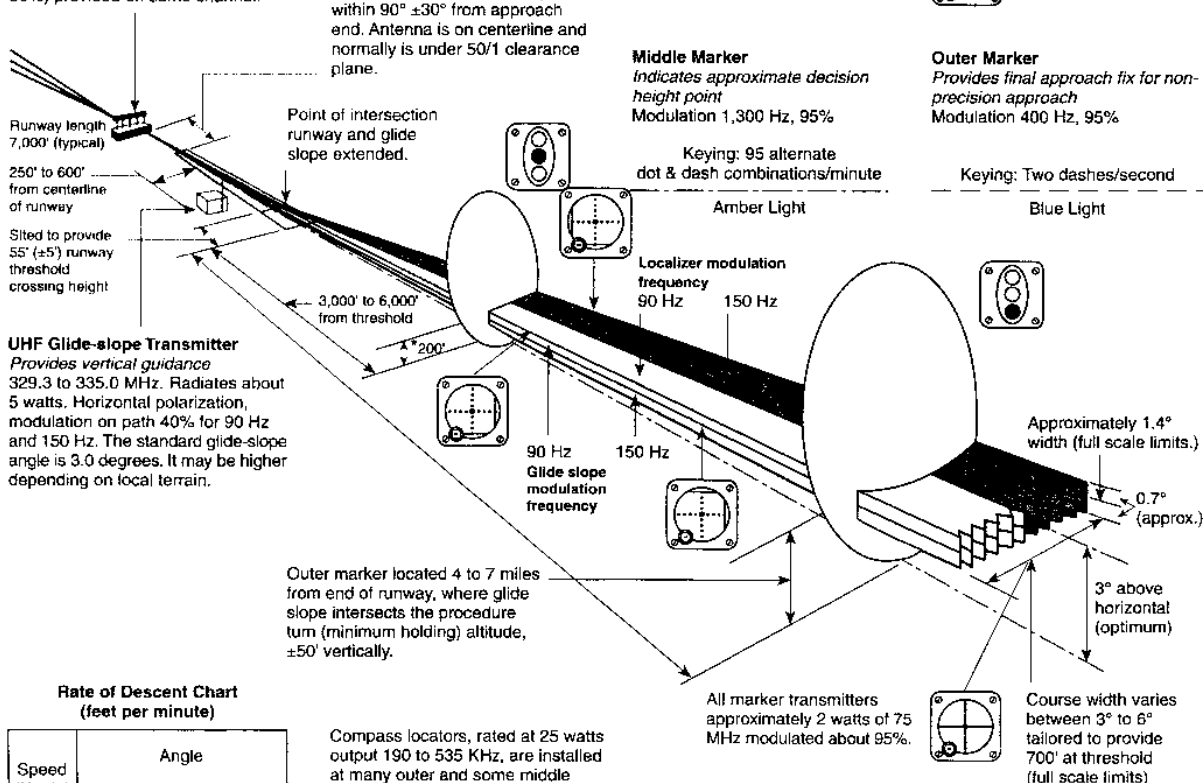
Provides horizontal guidance 108.10 to 111.95 MHz. Radiates about 100 watts. Horizontal polarization. Modulation frequencies 90 and 150 Hz. Modulation depth on course 20% for each frequency. Code identification (1020 Hz, 5%) and voice communication (modulated 50%) provided on same channel.

ILS approach charts should be consulted to obtain variations of individual systems.

1,000' typical. Localizer transmitter building is offset 250' minimum from center of antenna array and within 90° ±30° from approach end. Antenna is on centerline and normally is under 50/1 clearance plane.



Flag indicates if facility not on the air or receiver malfunctioning



Rate of Descent Chart
(feet per minute)

Speed (Knots)	Angle		
	2.5°	2.75°	3°
90	400	440	475
110	485	535	585
130	575	630	690
150	665	730	795
160	707	778	849

Compass locators, rated at 25 watts output 190 to 535 KHz, are installed at many outer and some middle markers. A 400 Hz or a 1020 Hz tone, modulating the carrier about 95%, is keyed with the first two letters of the ILS identification on the outer locator and the last two letters on the middle locator. At some locations, simultaneous voice transmissions from the control tower are provided, with appropriate reduction in identification percentage.

*Figures marked with asterisk are typical. Actual figures vary with deviations in distances to markers, glide angles and localizer widths.